AVVISO DI SEMINARIO

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Three-dimensional thermophotonic super-resolution imaging by spatiotemporal diffusion reversal methods: Biomedical and industrial nondestructive evaluation applications

An efficient new thermal-wave inverse-problem approach based on an integral-equation boundary value method coupled with an imperialist competitive algorithm (ICA) was developed. Themethodology was successfully applied to simultaneously reconstruct density and thermal
conductivity depth profiles in a sintered powder metallurgy sample from an industrial automotive manufacturer with inhomogeneous density depth profile and a surface layer of higher density than the bulk. The density and conductivity depth profiles were validated independently using the manufacturer's data and in-house porosity measurements. The present non-destructive inverse problem approach represents a generalized formalism to thermal-wave reconstruction optimization of dual depth profiles using frequency scan data measured from the interrogated surface. From a fundamental viewpoint, the method adds significant insights into the relationship between thermal conductivity and density distributions in inhomogeneous solids.

(*) With Sahar Kooshki and Alexander Melnikov

DIPARTIMENTO DI SCIENZE
DI BASE E APPLICATE
PER L'INGEGNERIA

SAPIENZA
UNIVERSITÀ DI ROMA

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